IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES
Docket No. 13479US04

IN THE APPLICATION OF:

Oscar E. Agazzi

SERIAL NO.: 10/767,514

FILED: January 29, 2004

FOR: STARTUP PROTOCOL FOR HIGH THROUGHPUT COMMUNICATIONS SYSTEMS

ART UNIT: 2611

EXAMINER: Dac V. Ha

Conf. No.: 5537

Electronically Filed on July 24, 2008

BRIEF ON APPEAL

Mail Stop: Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an appeal from an Office Action dated October 24, 2007, in which claims 1-18 were finally rejected.

REAL PARTY IN INTEREST

Broadcom Corporation, a corporation organized under the laws of the state of California, and having a place of business at 5300 California Avenue, Irvine, California 92617, has acquired the entire right, title and interest in and to the invention, the application, and any and all patents to be obtained therefor, as set forth in the Assignment recorded at Reel 009211, Frame 0933in the PTO assignment search room.

RELATED APPEALS AND INTERFERENCES

There currently are no appeals pending regarding related applications.

STATUS OF THE CLAIMS

Claims 1-28 were originally filed. Claims 19-28 were previously cancelled. Claims 1-18 are pending in the present application. Pending claims 1-18 stand rejected and are the subject of this appeal.

STATUS OF THE AMENDMENTS

None.

SUMMARY OF CLAIMED SUBJECT MATTER

Claim 1 is implemented in a communications system having a communications link with a master transceiver at a first end and a slave transceiver at a second end. Each transceiver has a noise reduction system, a timing recovery system and at least one equalizer, all converging at startup of the system. The invention is a startup protocol whereby, for each transceiver, the convergence of the equalizer and the timing recovery system is separated from the convergence of the noise reduction system.

The invention of claim 1 is illustratively described in the Specification of the present application at, for example, page 18, line 8 – page 21, line 2, referring to Figure 13. FIG. 13 is a timing diagram showing the sequence of events during the startup protocol of the present invention.[1] FIG. 13 shows that during a first phase 114, the master device trains its near-end noise reduction system by converging the adaptive filters contained within its echo canceller and NEXT cancellation system (E).[2] During a second phase 116, the master trains its equalizers by converging the adaptive filters contained within its DFE and FFE (D), and simultaneously acquires timing

[1] Specification, page 18, lines 8-9.
[2] Specification, page 18, lines 13-15.

synchronization (P).[3] FIG. 13 also shows that during the first phase 114, the slave device trains its equalizers by converging the adaptive filters contained within its DFE and FFE (D), and simultaneously acquires timing synchronization (T).[4] During the second phase 116, the slave trains near-end noise reduction system by converging the adaptive filters contained within its echo canceller and NEXT cancellation system (E).[5] The invention of claim 1 is also described in other parts of the application, such as in the Summary of the Invention section.

Claims 2-6 are dependent upon claim 1.

Claim 7 is directed to a startup protocol for use in a communications system having a plurality of transceivers, one transceiver acting as a master and another transceiver acting as slave. Each transceiver has a noise reduction system, a timing recovery system and at least one equalizer. The claimed protocol includes executing a first stage during which the timing recovery system and the equalizer of the slave are trained and the noise reduction system of the master is trained, executing a second stage during which the timing recovery system and the equalizer of the master are trained and the noise reduction system of the slave is trained, and executing a third stage during which the noise reduction system of the master is retrained.

The invention of claim 7 is illustratively described in the Specification of the present application at, for example, page 18, line 8 – page 21, line 2, referring to Figure 13. FIG. 13 is a timing diagram showing the sequence of events during the startup protocol of the present invention.[6] FIG. 13 shows that during a first phase 114, the master device trains its near-end noise reduction system by converging the adaptive filters contained within its echo canceller and NEXT cancellation system (E).[7] During a second phase 116, the master trains its equalizers by converging the adaptive filters contained within its DFE and FFE (D), and simultaneously acquires timing synchronization (P).[8] FIG. 13 also shows that during the first phase 114, the slave device trains its equalizers by converging the adaptive filters contained within its DFE

---

[3] Specification, page 19, lines 17-21.
[4] Specification, page 18, lines 15-17.
[5] Specification, page 19, lines 15-17.
[6] Specification, page 18, lines 8-9.
[7] Specification, page 18, lines 13-15.
[8] Specification, page 19, lines 17-21.

and FFE (D), and simultaneously acquires timing synchronization (T).[9] During the second phase 116, the slave trains near-end noise reduction system by converging the adaptive filters contained within its echo canceller and NEXT cancellation system (E).[10] During a third phase 118, the master retrains its near-end noise reduction system by reconverging its echo canceller and NEXT cancellation system (E).[11] The invention of claim 7 is also described in other parts of the application, such as in the Summary of the Invention section.

Claims 8-14 are dependent upon claim 7.

Claim 15 is directed to a startup protocol for use in a communications system having a master transceiver at one end of a communications link and a slave transceiver at the opposite end of the communications link. Each transceiver has a near-end noise reduction system, a far-end noise reduction system, a timing recovery system and at least one equalizer. The claimed protocol includes a first phase, a second phase, and a third phase. During the first phase, the master is maintained in a half-duplex mode during which it transmits a signal but does not receive any signals, and the slave is maintained in a half-duplex mode during which it receives the signal from the master but does not transmit any signals. Also during the first phase, the master near-end noise reduction system is converged, the frequency and phase of the signal received by the slave are adjusted such that the frequency and phase are synchronized with the frequency and phase of the signal transmitted by the master, and the equalizer of the slave is converged. During the second phase, the slave is maintained in a half-duplex mode during which it transmits a signal but does not receive any signals, and the master is maintained in a half-duplex mode during which it receives the signal from the slave but does not transmit any signals. Also during the second phase, the frequency and phase of the slave are frozen, the slave near-end noise reduction system is converged, the phase of the signal received by the master is adjusted such that the phase is synchronized with the phase of the signal transmitted by the slave, and the equalizer of the master is converged. During the third phase, the slave is maintained in a full-duplex mode such that the slave transmits and receives signals, and the master is maintained in a full-duplex mode such that the master

[9] Specification, page 18, lines 15-17.
[10] Specification, page 19, lines 15-17.
[11] Specification, page 20, lines 20-22.

transmits and receives signals. The master near-end noise reduction system is reconverged during the third phase.

The invention of claim 7 is illustratively described in the Specification of the present application at, for example, page 18, line 8 – page 21, line 2, referring to Figure 13. FIG. 13 is a timing diagram showing the sequence of events during the startup protocol of the present invention.[12] The description of the first phase 114 phase at page 18, line 18 – page 19, line 14 makes clear that during the first phase 114, the master is maintained in a half-duplex mode during which it transmits a signal but does not receive any signals, and the slave is maintained in a half-duplex mode during which it receives the signal from the master but does not transmit any signals. During the first phase 114, the master near-end noise reduction system is converged (E),[13] the frequency and phase of the signal received by the slave are adjusted such that the frequency and phase are synchronized with the frequency and phase of the signal transmitted by the master (T),[14] and the equalizer of the slave is converged (D).[15] The description of the second phase 116 at page 19, line 15 – page 20, line 15 makes clear that during the second phase 116, the slave is maintained in a half-duplex mode during which it transmits a signal but does not receive any signals, and the master is maintained in a half-duplex mode during which it receives the signal from the slave but does not transmit any signals. During the second phase 116, the frequency and phase of the slave are frozen,[16] the slave near-end noise reduction system is converged (E),[17] the phase of the signal received by the master is adjusted such that the phase is synchronized with the phase of the signal transmitted by the slave (P),[18] and the equalizer of the master is converged (D).[19] The description of the third phase 118 at page 20, line 16 – page 21, line 2 makes clear that during the third phase, the slave is maintained in a full-duplex mode such that the slave transmits and receives signals, and the master is maintained in a full-duplex mode such that the master transmits and receives signals. The master near-end noise reduction system is

[12] Specification, page 18, lines 8-9.
[13] Specification, page 18, lines 13-15.
[14] Specification, page 18, lines 17-19.
[15] Specification, page 18, lines 15-17.
[16] Specification, page 19, lines 23-24.
[17] Specification, page 19, lines 15-17.
[18] Specification, page 19, lines 19-21.
[19] Specification, page 19, lines 17-19.

reconverged (E) during the third phase 118.[20] The invention of claim 15 is also described in other parts of the application, such as in the Summary of the Invention section.

Claims 16-18 are dependent upon claim 15.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

I. Claims 1-18 stand rejected under 35 U.S.C. § 103(a) as being anticipated by U.S. Patent 5,864,545 issued to Mark Gonikberg, et al.

[20] Specification, page 20, lines 20-22.

ARGUMENT

I. Claims 1-18 are not obvious under 35 U.S.C. § 103(a) in view of Gonikberg et al. (US 5,864,545).

In the Office Action of October 24, 2007, the Examiner rejected claims 1-18 under 35 U.S.C. § 103(a) as being unpatentable over Gonikberg (US 5,864,545). 35 U.S.C. 103(a) states:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

The Supreme Court in *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966), laid out the standard of patentability to be applied in obviousness rejections, stating:

> Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined.

A. Claims 1-6 are not obvious under 35 U.S.C. § 103(a) in view of Gonikberg et al. (US 5,864,545).

Claim 1 is directed to:

> 1. In a communications system having a communications link with a master transceiver at a first end and a slave transceiver at a second end, each transceiver having a noise reduction system, a timing recovery system and at least one equalizer, all converging at startup of the system, a startup protocol comprising:
>
> for each transceiver, separating the convergence of the equalizer and the timing recovery system from the convergence of the noise reduction system.

Thus the startup protocol of claim 1 includes an operation of: "for each transceiver, separating the convergence of the equalizer and the timing recovery system from the convergence of the noise reduction system." The Examiner asserts that this aspect of the present invention is taught by Gonikberg at column 6, line 49 – column 7, line 11.[21] Appellant respectfully disagrees. According to this excerpt of Gonikberg, the echo canceller 410 and the equalizer 490 can be decoupled during transmit-only and receive-only phases of half-duplex training (col. 6, lines 55-60), but there is no mention of separating the convergence of a timing recovery system from the convergence of a noise reduction system, per claim 1. For at least this reason, claim 1 is not rendered obvious by Gonikberg.

Appellant made the above argument in the Response filed on August 20, 2007. Responding to said argument in the Office Action mailed on October 24, 2007, the Examiner asserted, "However, Gonikberg teach that the 'noise reduction system' is not coupled during the receive-only phase (col. 7, lines 9-12). During this receive-only phase, there is a 'timing recovery system' connected as shown in FIG. 6, element 682. Thus this effectively teaches the separation between the timing recovery system and the noise reduction system, as claimed."[22] But Gonikberg says nothing at all about the *convergence* of the timing recovery block 682. That is, Gonikberg does not indicate whether the timing recovery block 682 is converged during the transmit-only phase of half-duplex training, during the receive-only phase of half-duplex training, neither or both. Therefore, it cannot be said that Gonikberg teaches separating the convergence of the timing recovery system from the convergence of the noise reduction system per claim 1. Furthermore, since FIG. 6 of Gonikberg corresponds to both the receive-only and transmit-only phases,[23] the inclusion of the timing recovery block 682 in FIG. 6 in no way indicates that the *convergence* of the timing recovery block 682 is separated from the convergence of the noise reduction system.

For the above reasons, Appellant submits that claim 1 is not rendered obvious by Gonikberg. Appellant therefore requests allowance of claim 1 and claims 2-6 depending therefrom.

---

[21] Office Action dated October 24, 2007, item 4, pages 2-3.
[22] Office Action dated October 24, 2007, item 5, page 5.
[23] Gonikberg, U.S. Patent 5,864,545, col. 8, line 3.

B. Claims 7-14 are not obvious under 35 U.S.C. § 103(a) in view of Gonikberg et al. (US 5,864,545).

Claim 7 is directed to:

> 7. A startup protocol for use in a communications system having a plurality of transceivers, one transceiver acting as a master and another transceiver acting as slave, each transceiver having a noise reduction system, a timing recovery system and at least one equalizer, said protocol comprising:
>
> executing a first stage during which the timing recovery system and the equalizer of the slave are trained and the noise reduction system of the master is trained;
>
> executing a second stage during which the timing recovery system and the equalizer of the master are trained and the noise reduction system of the slave is trained; and
>
> executing a third stage during which the noise reduction system of the master is retrained.

Appellant submits that claim 7 is allowable over Gonikberg for the reasons set forth above with respect to claim 1. In addition, the Examiner asserts that claim 7 is taught by Gonikberg at column 3, lines 4-15.[24] This excerpt of Gonikberg merely teaches updating coefficients of an echo canceller during a transmit-only phase of half duplex training and updating coefficients of an equalizer during a receive-only phase of half duplex training.[25] This does not teach "executing a first stage during which the timing recovery system and the equalizer of the slave are trained and the noise reduction system of the master is trained; (and) executing a second stage during which the timing recovery system and the equalizer of the master are trained and the noise reduction system of the slave is trained," per claim 7. Specifically, Gonikberg says nothing at all about the convergence of elements in a second transceiver that is in communication with the transceiver referred to in Gonikberg, and certainly says nothing about the specific interplay of the convergence of elements between a first, master, device and a second,

[24] Office Action dated October 24, 2007, item 4, page 4.
[25] Gonikberg, U.S. Patent 5,864,545, col. 3, lines 4-15.

slave, device set forth in claim 7. On page 6 of the final Office Action, the Examiner states, "As indicated previously, when the 'master' transceiver (a first modem) transmits, the 'noise reduction system' is coupled in the master transceiver, therefore the noise reduction system is trained. However, at the same time, in the slave transceiver (a second modem), which is in receive-only phase, only the equalizer and the timing recovery systems are trained (as indicated above). Similarly, the second stage occurs when the master is in receive-only phase and the slave is in the transmit-only phase. The opposite to what occurs in the first stage would happen in the second stage." However, the Examiner does not cite Gonikberg for these allegations, but appears to be, at best, filling in the blanks of Gonikberg, or, at worst, just making it up. Either way, Gonikberg does not teach these aspects of claim 7 and the Examiner fails to provide any teaching of these aspects of claim 7 whatsoever. Furthermore, as argued above with respect to claim 1, Gonikberg does not teach the separation of the convergence of a timing recovery system and a noise reduction system, as is claimed in claim 7.

For the above reasons, Appellant submits that claim 7 is not rendered obvious by Gonikberg. Appellant therefore requests allowance of claim 7 and claims 8-14 depending therefrom.

C. Claims 15-18 are not obvious under 35 U.S.C. § 103(a) in view of Gonikberg et al. (US 5,864,545).

Claim 15 includes limitations similar to those included to those in claims 1 and 7 and was rejected only with reference to the rejections of claims 1-14. Appellant submits that claim 15, and claims 16-18 depending therefrom, are allowable for the reasons set forth above with respect to claims 1 and 7.

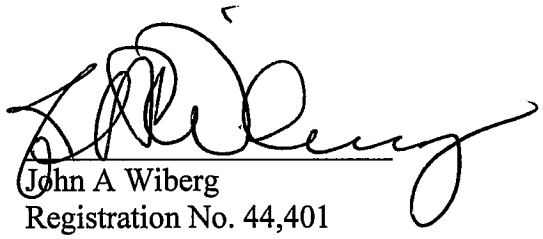
II. Conclusion

For at least the foregoing reasons, Appellant submits that claims 1-18 are not rendered obvious by Gonikberg. Reversal of the Examiner's rejection and issuance of a patent on the application are therefore requested.

The Commissioner is hereby authorized to charge $510 (to cover the Brief on Appeal Fee) and any additional fees or credit any overpayment to the deposit account of McAndrews, Held & Malloy, Account No. 13-0017.

Dated: July 24, 2008

Respectfully submitted,



John A Wiberg
Registration No. 44,401
Attorney for appellant

McANDREWS, HELD & MALLOY, LTD.
500 West Madison Street, 34th Floor
Chicago, IL 60661
Telephone: (312) 775-8000
Facsimile: (312) 775-8100

APPENDIX

(37 C.F.R. § 1.192(c)(9))

The following claims are involved in this appeal:

1. In a communications system having a communications link with a master transceiver at a first end and a slave transceiver at a second end, each transceiver having a noise reduction system, a timing recovery system and at least one equalizer, all converging at startup of the system, a startup protocol comprising:

for each transceiver, separating the convergence of the equalizer and the timing recovery system from the convergence of the noise reduction system.

2. The startup protocol of claim 1 wherein the step of separating the convergence of the equalizer and the timing recovery system from the convergence of the noise reduction system comprises:

converging the equalizer and the timing recovery system of the slave while converging the noise reduction system of the master;

upon completion of converging the equalizer and the timing recovery system of the slave and the noise reduction system of the master, converging the equalizer and the timing recovery system of the master while converging the noise reduction system of the slave; and

upon completion of converging the equalizer and the timing recovery system of the master and the noise reduction system of the slave; reconverging the noise reduction system of the master.

3. The startup protocol of claim 2 wherein converging the equalizer and the timing recovery system of the master while converging the noise reduction system of the slave further comprises the step of resetting the noise reduction system of the master.

4. The startup protocol of claim 2 wherein converging the equalizer and the timing recovery system of the master while converging the noise reduction system of the slave further comprises the step of freezing the timing recovery system of the slave.

5. The startup protocol of claim 1 wherein each of the noise reduction systems includes an echo canceller.

6. The startup protocol of claim 5 wherein each of the noise reduction systems further includes a NEXT cancellation system.

7. A startup protocol for use in a communications system having a plurality of transceivers, one transceiver acting as a master and another transceiver acting as slave, each transceiver having a noise reduction system, a timing recovery system and at least one equalizer, said protocol comprising:

executing a first stage during which the timing recovery system and the equalizer of the slave are trained and the noise reduction system of the master is trained;

executing a second stage during which the timing recovery system and the equalizer of the master are trained and the noise reduction system of the slave is trained; and

executing a third stage during which the noise reduction system of the master is retrained.

8. The startup protocol of claim 7 further comprising:

transitioning from the first stage to the second stage; and

transitioning from the second stage to the third stage.

9. The startup protocol of claim 8 wherein each stage is of a fixed time duration and the transitioning between stages occurs upon completion of the time duration.

10. The startup protocol of claim 9 wherein the time duration of the stages is substantially equal.

11. The startup protocol of claim 8 wherein transitioning from the first stage to the second stage comprises:

transmitting a signal from the slave to the master;

detecting the signal at the master; and

ceasing transmission from the master.

12. The startup protocol claim 11 wherein the transmission of the signal from the slave occurs upon completion of the training of the timing recovery system and the equalizer of the slave.

13. The startup protocol of claim 8 wherein transitioning from the second stage to the third stage comprises the steps of:

transmitting a signal from the master to the slave;

detecting the signal at the slave; and

continuing transmission from the slave.

14. The startup protocol of claim 13 wherein the transmission of the signal from the master occurs upon completion of the training of the timing recovery system and the equalizer of the master.

15. A startup protocol for use in a communications system having a master transceiver at one end of a communications link and a slave transceiver at the opposite end of the communications link, each transceiver having a near-end noise reduction system, a far-end noise reduction system, a timing recovery system and at least one equalizer, said protocol comprising:

during a first phase:

maintaining the master in a half-duplex mode during which it transmits a signal but does not receive any signals,

maintaining the slave in a half-duplex mode during which it receives the signal from the master but does not transmit any signals,

converging the master near-end noise reduction system, adjusting the frequency and phase of the signal received by the slave such that the frequency and phase are synchronized with the frequency and phase of the signal transmitted by the master,

converging the equalizer of the slave;

during a second phase:

maintaining the slave in a half-duplex mode during which it transmits a signal but does not receive any signals,

maintaining the master in a half-duplex mode during which it receives the signal from the slave but does not transmit any signals,

freezing the frequency and phase of the slave,

converging the slave near-end noise reduction system,

adjusting the phase of the signal received by the master such that the phase is synchronized with the phase of the signal transmitted by the slave,

converging the equalizer of the master; and

during a third phase:

maintaining the slave in a full-duplex mode such that the slave transmits and receives signals,

maintaining the master in a full-duplex mode such that the master transmits and receives signals,

reconverging the master near-end noise reduction system.

16. The protocol of claim 15 wherein the near-end noise reduction systems include an echo canceller and a NEXT cancellation system, the far-end noise reduction system includes a FEXT cancellation system and, during the first stage, the step of converging the master noise reduction system comprises the steps of adjusting the coefficients of the master echo canceller and NEXT cancellation system and, during the second stage, the step of converging the slave noise reduction system comprises the steps of adjusting the coefficients of the slave echo canceller and NEXT cancellation system and the protocol further comprises:

during the first phase, converging the slave far-end noise reduction system by adjusting the coefficients of the FEXT cancellation system; and

during the second phase, converging the master far-end noise reduction system by adjusting the coefficients of the FEXT cancellation system.

17. The protocol of claim 15 wherein the master near-end noise reduction system includes an echo canceller and, during the first phase, converging the master near-

end noise reduction system comprises adjusting the coefficients of the echo canceller and the protocol further comprises:

during the second phase, discarding the coefficients of the echo canceller.

18. The protocol of claim 15 wherein the master near-end noise reduction system includes a NEXT cancellation system and, during the first phase, the step of converging the master near-end noise reduction system comprises the step of adjusting the coefficients of the NEXT cancellation system and the protocol further comprises the step of:

during the second phase, discarding the coefficients of the NEXT cancellation system.

EVIDENCE APPENDIX

Not applicable.

RELATED PROCEEDINGS APPENDIX

The Appellant is unaware of any related appeals or interferences.